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EXAMINER	
MARTELLO, EDWARD	

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2628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/521,131	Applicant(s) PASQUALINI ET AL.	
	Examiner Edward Martello	Art Unit 2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 13 May 2009.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-5 and 8-12 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-5 and 8-12 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to the amendment received 13 May 2009.

2. The amendment of claims 1 and 12 has cured the basis of the objections to the claims, thus, the objection to claims 1 and 12 is hereby withdrawn.

3. The amendment of claim 1 has cured the basis of the 35 U.S.C. § 101 rejection of claim 1, thus, the 35 U.S.C. § 101 rejection of Claim 1 is hereby withdrawn. The 35 U.S.C. § 101 rejection of dependent claims 2-5 and 8-11 are also withdrawn.

4. Claims 1 and 12 are amended. Claims 2-5 and 8-11 are as previously presented and claims 6-7 and 13-20 are cancelled.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1-5, 8 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bachmann et al. (U.S. Patent 5,436,673, already of record, hereafter '673) and in view of Udagawa et al. (U. S. Patent 4,731,662, already of record, hereafter '662).

6. Regarding claim 1(Currently Amended), Bachmann teaches a method of non-linear processing ('673; figs. 1 and 3A-3D; col. 3, ln. 54-60; col. 5, ln. 26-31 – where the curve changes slope – non-linear) of at least one set of luminance, saturation, and hue parameter values ('673; fig. 1, inputs converted, as necessary, to hue, sat and Y - luminance) of input picture signals ('673; fig. 1; col. 2, ln. 62-68, col. 3, ln. 1-6) so as to produce output picture signals ('673; fig. 1; col. 2, ln. 62-68, col. 3, ln. 1-6) based on the hue parameter value and an output luminance parameter value and an output saturation parameter value ('673; fig. 1), wherein the method comprises the steps of: receiving input picture signals ('673; fig. 1; col. 2, ln. 62-68, col. 3, ln. 1-6); determining, using a matrix converter block ('673; fig. 1, element 5) , input luminance, saturation and hue parameter values of said input picture signals ('673; fig. 1, elements 13, 14 and 15); but does not teach obtaining the output saturation parameter value by increasing the input saturation parameter value up to a maximum level in a saturation processing block; and determining said maximum level using the input hue value and the output luminance parameter value in a saturation bound evaluation block such that clipping of a color driving value does not take place. Udagawa, working in the same field of endeavor, however, teaches obtaining the output saturation parameter value by increasing the input saturation parameter value up to a maximum level in a saturation processing block ('662; col. 4, ln. 22-45); and determining lock said maximum level using the input hue value and the output luminance parameter value in a saturation bound evaluation block ('662; fig. 4 & 5) such that clipping of a

color driving value does not take place ('662; col. 4, ln. 22-68) for the benefit of maximizing the saturation of the colors contained in an input image while keeping the boost within the bound of the capability of the output device to produce the brightest possible color image without distorting the perceived color value or hue of the image. It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the saturation enhancement teachings of Udagawa with color compensation methods based on hue as taught by Bachmann for the benefit of maximizing the saturation of the colors contained in an input image while keeping the boost within the bound of the capability of the output device to produce the brightest possible color image without distorting the perceived color value or hue of the image.

7. In regard to claim 2 (Previously Presented), Bachmann and Udagawa teach the method of as claimed in claim 1 and Bachmann further teaches wherein the non-linear processing comprises the steps of: determining a power (any desired function; '673; col. 4, ln. 29-33) depending on the hue parameter values; and raising the input saturation parameter value to the power (any desired function; '673; col. 4, ln. 29-33) $\cancel{\gamma_h}$ (SAT*KORR.SAT, '673; fig. 1, functional block 17).

8. Regarding claim 3 (Previously Presented), Bachmann and Udagawa teach the method ~~of~~ as claimed in claim 2, and further teach wherein said method further comprises the step of: adapting the power (any desired function; '673; col. 4, ln. 29-33) but does not teach that it is based on histogram data derived from one or more of the input parameter values. However, Udagawa, working in the same field of endeavor, teaches a method comprising the step of adapting the power (saturation compression; '662, col.4, ln. 23-45) based on histogram data derived from the input parameter values ('662, col. 4, ln. 5) ('662; fig. 5; col.4, ln. 23-45) for the

benefit of providing a method that is able to handle the condition where the density range of color saturation values of an input image signal is broader than the density range of a target output device so that the compression compensation is controlled in a manner to avoid the loss of picture detail because the histogram equalization allows the color saturation to be increased more for picture areas showing low saturation density levels than for picture areas showing high saturation density levels while preventing the overall corrected signal from exceeding the saturation limit or clipping level of the output device. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined the teachings of Bachmann and the histogram teachings of '662 to provide a method to handle the condition where the density range of color saturation values of an input image signal is broader than the density range of a target output device so that the compression compensation is controlled in a manner to avoid the loss of picture detail because the histogram equalization allows the color saturation to be increased more for picture areas showing low saturation density levels than for picture areas showing high saturation density levels while preventing the overall corrected signal from exceeding the saturation limit or clipping level of the output device.

9. In regard to claim 4 (Previously Presented), Bachmann and Udagawa teach the method as claimed in claim 1 and Bachmann further teaches wherein the non-linear processing comprises the steps of: determining a power (any desired function; '673; col. 4, ln. 29-33) depending on the hue parameter value; and raising the input luminance parameter value to the power (any desired function; '673; col. 4, ln. 29-33) (Y*KORR.LUM, '673; fig. 1, functional block 18).

10. Regarding claim 5 (Previously Presented), Bachmann and Udagawa teach the method as claimed in claim 4 and further teach wherein said method further comprises the step of: adapting

the power (any desired function; ‘673; col. 4, ln. 29-33) but does not teach that it is based on histogram data derived from one or more of the input parameter values. However, Udagawa, working in the same field of endeavor, teaches a method comprising the step of adapting the power (luminance compression; ‘662, col.4, ln. 23-45) based on histogram data derived from the input parameter values (‘662, col. 4, ln. 5) (‘662; fig. 5; col.4, ln. 23-45) for the benefit of providing a method that is able to handle the condition where the density range of luminance values of an input image signal is broader than the density range of a target output device so that the compression compensation is controlled in a manner to avoid the loss of picture detail because the histogram equalization allows the luminance to be increased more for picture areas showing low luminance density levels than for picture areas showing high luminance density levels while preventing the overall corrected signal from exceeding the luminance saturation limit or clipping level of the output device. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined the teachings of Bachmann and the histogram teachings of ‘662 to provide a method to handle the condition where the density range of luminance values of an input image signal is broader than the density range of a target output device so that the compression compensation is controlled in a manner to avoid the loss of picture detail because the histogram equalization allows the luminance to be increased more for picture areas showing low luminance density levels than for picture areas showing high luminance density levels while preventing the overall corrected signal from exceeding the luminance saturation limit or clipping level of the output device.

11. Claims 6-7 (Cancelled).

12. In regard to claim 8 (Previously Presented), Bachmann and Udagawa teach the method as claimed in claim 1, and Bachmann further teaches wherein the maximum level depends on the output luminance parameter value ('673; fig. 7 and 8; output of functional block 44 applied to multiplier functional block 48; '673; fig. 1; col 6, ln. 62-68, col. 7, ln. 1-12).

13. In regard to claim 10 (Previously Presented), Bachmann and Udagawa teach the method as claimed in claim 3 and further teach wherein, for a predetermined hue parameter value, the power (any desired function; '673; col. 4, ln. 29-33) is adapted on the basis of a weighed average input saturation parameter value of the input picture signals, representing pixels in a window of an image. ('662; fig. 5 & 6; col. 4, ln. 20-68) (Note that Udagawa uses the symbol C for saturation, '662; col. 3, ln. 64-68).

14. Regarding claim 11 (Previously Presented), Bachmann and Udagawa teach the method as claimed in claim 10 and further teach wherein, for a predetermined hue parameter value, the power (any desired function; '673; col. 4, ln. 29-33) for a current ('662; fig. 5 & 6; col. 4, ln. 20-68) (Note that Udagawa uses the symbol C for saturation, '662; col. 3, ln. 64-68) but does not teach and/or a previous window. It would have been obvious to one of ordinary skill at the time of the invention to have made the design choice of implementing the storing of histograms of previous frames in the memories contained in either cited patent and making the decision to use the current histogram or the previously stored values for the benefit of preventing or smoothing over abrupt scene changes in the input video stream.

15. In regard to claim 12 (Currently Amended), Bachmann teaches an apparatus for non-linear processing ('673; figs. 1 and 3A-3D; col. 3, ln. 54-60; col. 5, ln. 26-31 – where the curve changes slope – non-linear) of at least one set of luminance, saturation, and hue parameter values

(‘673; fig. 1, inputs converted, as necessary, to hue, sat and Y - luminance) of input picture signals (‘673; fig. 1; col. 2, ln. 62-68, col. 3, ln. 1-6) so as to produce output picture signals based on the hue parameter value and an output luminance parameter value and an output saturation parameter value (‘673; fig. 1; col. 2, ln. 62-68, col. 3, ln. 1-6), the apparatus comprising: means for receiving input picture signals (‘673; fig. 1); means for determining input luminance, saturation and hue parameter values of said input picture signals (‘673; fig. 1, elements 13, 14 and 15); but does not teach means for obtaining the output saturation parameter value by increasing the input saturation parameter value up to a maximum level; and means for determining said maximum level using the input hue value and the output luminance parameter value such that clipping of a color driving value does not take place. Udagawa, working in the same field of endeavor, however, teaches obtaining the output saturation parameter value by increasing the input saturation parameter value up to a maximum level (‘662; fig. 10B; col. 4, ln. 22-45); and determining said maximum level using the input hue value (and the output luminance parameter value such that clipping of a color driving value does not take place.

16. Claims 13-20 (Cancelled).

17. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bachmann et al. (U.S. Patent 5,436,673, already of record, hereafter ‘673), as applied to claims 1- 5, 8 and 10-12 above, and in view of and in view of Udagawa et al. (U. S. Patent 4,731,662, already of record, hereafter ‘662), as applied to claims 1-5, 8 and 10-12, and further in view of Yamada et al. (U. S. Patent 5,742,296, already of record, hereafter ‘296).

18. Regarding claim 9 (Previously Presented), Bachmann and Udagawa teach the method as claimed in claim 2, but do not teach wherein the modified output saturation parameter value is substantially determined by the equation:

$S' = S_{max} (S/ S_{max})^{\gamma h}$,

where S is the saturation parameter value, S_{max} is the maximum saturation value, and γ_h, is the power. Yamada, working in the same field of endeavor, however, teaches a method for the benefit of preventing over saturation of the S values in the corrected image, wherein a saturation-related output parameter value S' (γ_0) that is substantially determined by the equation: $S' = S_{max}*(S/ S_{max})^{\gamma h}$ $\{\gamma_0 = \gamma_1(1-(1- \gamma_p\backslash \gamma_t)**\gamma_t \gamma_i\}$ ('296; col. 6, ln. 63-67, col. 7, ln. 1-2) where all the gamma values (saturations) are normalized to the value of 1 so that the form of this equation becomes the form of the instant application. In addition, γ_t corresponds to S, γ_p corresponds to S_{max} and γ_1 is approximately equal to S_{max} ('296; col. 6, ln. 25-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined the previous teachings Bachmann and to include the teachings of '296 to provide an additional method to handle the condition where the total range of color saturation values of an input image signal is broader than the input range of a target output device thus allowing the controlling of the saturation compensation in a manner that avoids the loss of color saturation because the equalization allows the color saturation to be increased more for picture areas showing low saturation levels than for picture areas showing high saturation levels while preventing the overall corrected signal from exceeding the saturation limit or clipping level of the output device.

Response to Arguments

19. Applicant's arguments filed 13 May 2009 have been fully considered but they are not persuasive.

20. The Applicants wrote.

The Examiner has indicated that while Bachmann et al. teaches "receiving input picture signals" and "determining input luminance, saturation and hue parameter values of said input picture signals", Bachmann et al. does not teach "obtaining the output saturation parameter value by increasing the input saturation parameter value up to a maximum level" and "determining said maximum level using the input hue value and the output luminance parameter value such that clipping of a color driving value does not take place" The Examiner then states that Udagawa et al. teaches these limitations and notes col. 4, lines 22-45.

Applicants submit that the Examiner is mistaken. In particular, the noted section of Udagawa et al. states:

"At step SII, a saturation histogram of an input color signal is formed by forming a distribution of pixels constituting an image frame for each hue signal H; in other words, the saturation distribution is checked with respect to each of a plurality of
predetermined hues. Next, at step S12 the maximum saturation C(H)max and the minimum saturation C(H)min are detected for each hue signal H. At step S13, the difference between C(H)max and C(H)min and the maximum reproducing saturation C(H)L measured beforehand of the color printer for each hue signal H, are compared with each other. If C(H)max-C(H)min>C(H)L at step S13, then step S14 follows to perform a saturation compression process and obtain an output saturation C' (H) in accordance with the following formula.

"As above, the saturation compression process as shown in FIG. 6A is carried out. Thus, it is possible to conduct saturation compression without destroying chromaticity continuity."

21. The Examiner respectfully disagrees with the above analysis with respect to the claim 1 as amended. The Examiner notes that the cite now includes most of column 4 of Udagawa which includes figures 6A through 6C where it is shown in the figures and the text that the saturation is boosted up to the maximum as determined by the maximum capabilities of the output gamut.

22. The Applicants continue:

Applicants first would like to point out that there is no mention in Udagawa et al. of the output luminance parameter value, let alone the claim limitation "determining said maximum level using the input hue value and the output luminance parameter value in a saturation bound evaluation block such that clipping of a color driving value does not take place". Further, while Udagawa et al. discloses determining the output saturation (C' (H)), there is no disclosure or suggestion of increasing the input saturation up to a

maximum level. Rather, Udagawa et al. merely detects the input maximum and minimum saturation for each hue signal.

23. The Examiner covered the comments on saturation maximum above. In regard to output luminance parameter value, it should be noted that Udagawa passes the input luminance parameter value to the output color conversion matrix unchanged so that the output luminance equals the input luminance and is used in the color modifying methods and thus meets the limitations of claim 1. (See Udagawa figure 4).

24. The Applicants continue:

Claim 3 includes the limitation "adapting the power based on histogram data derived from one or more of the input parameter values".

The Examiner has indicated: "Udagawa, working in the same field of endeavor, teaches a method comprising the step of adapting the power (saturation compression; "662, coi.4, ln. 23-45) based on histogram data derived from the input parameter values ('662, col. 4, ln. 5) ('662; fig. 5; coi.4, ln. 23-45) for the benefit of providing a method that is able to handle the condition where the density range of color saturation values of an input image signal is broader than the density range of a target output device so that the compression compensation is controlled in a manner to avoid the loss of picture detail because the histogram equalization allows the color saturation to be increased more for picture areas showing low saturation density levels than for picture areas showing high saturation density levels while preventing the overall corrected signal from exceeding the saturation limit or clipping level of the output device."

Applicants submit that while Udagawa et al. uses histogram processing to determine the output saturation, there is no disclosure or suggestion of raising the input saturation by a power, and that the raising power is determined by "histogram data derived from one or more of the input parameter values."

25. The Examiner respectfully disagrees with the above analysis. First, claim 3 is dependent upon claim 1 and the last citation in claim 1, ('662; col. 4, ln. 22-68), shows that the correction is based upon histogram data of the saturation data, lines 23-24. Secondly, the processing is non-linear which is equivalent to raising the input saturation by a power and is often done through the use of a lookup table as done by Bachmann.

26. The Applicants continue:

The Yamada et al. patent discloses an image processing method and apparatus therefor.

Claim 9 includes the limitation "the output saturation parameter value is substantially determined by the equation:

$S' = S_{max} (S/ S_{max})^{\gamma h}$,

where S is the saturation parameter value, Smax is the maximum saturation value, and $^{\gamma h}$ is the power" The Examiner has indicated: "Yamada, working in the same field of endeavor, however, teaches a method for the benefit of preventing over saturation of the S values in the corrected image, wherein a saturation-related output parameter value S' (yo) that is substantially determined by the equation: S': Smax*(S/Smax)Yh {Yo:Yl(l-(l- Yp\Yt)**Yc Yi] ('296; col. 6, ln. 63-67, col. 7, ln. 1-2) where all the gamma values (saturations) are normalized to the value of 1 so that the form of this equation becomes the form of the instant application. In addition, Yt corresponds to S, yp corresponds to Smax and yj is approximately equal to Smax ('296; col. 6, ln. 25-45)."

However, Applicants submit that Yamada et al. does not supply that which is missing from Bachmann et al., i.e., "obtaining the output saturation parameter value by increasing the input saturation parameter value up to a maximum level" and "determining said maximum level using the input hue value and the output luminance parameter value such that clipping of a color driving value does not take place."

27. The Examiner covered the comments on processing to the saturation maximum above in the response to claims 1 and 3. Claim 9 is depended form claim 2 which is dependent from claim 1 so all of the comments applied to claim 1 apply to claim 9. In addition, claim 9 includes the limitations of claim 3 and the response to claim 3 has been addressed above. As stated in the comments above in regard to output luminance parameter value, it should be noted that Udagawa passes the input luminance parameter value to the output color conversion matrix unchanged so that the output luminance equals the input luminance and is used in the color modifying methods and thus meets the limitations of claim 1. (See Udagawa figure 4).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edward Martello whose telephone number is (571) 270-1883. The examiner can normally be reached on M-F 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Xiao Wu can be reached on (571) 272-7761. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kee M Tung/
Supervisory Patent Examiner, Art Unit 2628

/EM/
Examiner, Art Unit 2628